

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claim 2 is cancelled without prejudice to or disclaimer of the contents thereof. Claims 1 and 3-21 are pending. Claims 1 and 3 are amended, and claims 7-21 are added. Claims 1, 4-7, and 16 are independent. The Examiner is respectfully requested to reconsider the rejections in view of the amendments and remarks set forth herein.

Allowable Subject Matter

The Examiner states that claim 3 would be allowable if rewritten in independent form.

Applicants thank the Examiner for the early indication of allowable subject matter in this application. However, allowable claim 3 has not been rewritten in independent form at this time. It is believed that independent claim 1, as amended herein to incorporate the subject matter of dependent claim 2, is now in condition for allowance.

Drawings

It is gratefully appreciated that the Examiner has accepted the drawings.

Claim for Priority

It is gratefully appreciated that the Examiner has acknowledged the Applicants' claim for foreign priority.

Information Disclosure Citation

Applicants thank the Examiner for considering the reference supplied with the Information Disclosure Statement filed February 25, 2005, and for providing the Applicants with an initialed copy of the PTO form filed therewith.

Restriction Requirement

The Examiner has made the Restriction Requirement final, and has withdrawn claims 4-6 from further consideration. The Applicants reserve the right to file a divisional application directed to claims 4-6 at a later date if so desired.

Rejections Under 35 U.S.C. § 102(b)

Claim 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Park (U.S. Patent 5,993,347).

This rejection is respectfully traversed.

Arguments Regarding Independent Claim 1

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application, independent claim 1 has been amended herein to recite a combination of elements directed to a reduction gear for a walking assistance system, including *inter alia*

the first planetary gear mechanism (P₁) comprising a first sun gear (ZS₁) provided on the input shaft (S_i) and a first carrier (C₁) that rotates the first planetary gear mechanism (P₁), , and the first carrier (C₁) is fixed to a casing (41).

In independent claim 1 as amended, the first planetary gears (ZP_1) are fixed to a casing (41) while the first sun gear (ZS_1) is provided on the input shaft(S_i).

The Examiner relies on the teaching of Fig. 5 of Park to reject claims 1 and 2 on file. A review of the relevant portions of Park indicates that this reference fails to teach or suggest the above arrangement defined by the combination of claims 1 and 2 on file. Attached are columns 9-10 and Fig. 6 of the Park reference since they are considered to include editorial errors. The Applicants have inserted by hand proposed corrections to these copies of the Park reference. The first to six speed stages provided by the arrangement of Fig. 5 of the Park reference are described at column 9, lines 15 to 67. Based on the description at that portion, Fig. 6 should be corrected as shown in the attached annotated copy. It appears that the gear arrangement at the first speed stage is analogous to the invention defined by the above amended claim 1, and secondly the six speed stage is analogous to the invention of column 1.

Park Fig. 6 shows that at the first stage, clutch 14 is not connected, but this appears to be wrong. Column 9, lines 17-19 states that first brake 84 is operated. Any member having a reference numeral 84 is not shown, and therefore should be corrected to be first brake 14 from the context. In this stage, sun gear 34 is connected to input shaft 26 through clutch 8. Here, if the arrangement of Fig. 5 of Park in the first speed stage is compared with the arrangement of amended claim 1 of the present invention, it is apparent that there is no teaching or suggestion in the reference to make the (first) planetary gears, connected with line 36, fixed to the casing 42, since clutch 18 should be disconnected at that time.

In the six speed stage of Fig. 6 of Park, the (first) planetary gears seem to be fixed to the casing 42 through clutch 18. However, in this state, input shaft 26 is connected to ring gear 32 through clutch 12 and not to the sun gear 34 through clutch 8. The other speed stages are quite different from that defined in our amended claim 1 (or claim 2).

Thus, Park fails to teach all of the features of independent claim 1 combined with claim 2 as set forth in this Amendment.

At least for the reasons explained above, Applicants respectfully submit that the combination of elements as set forth in independent claim 1 is not disclosed or made obvious by the prior art of record, including Park '347.

Therefore, independent claim 1 is in condition for allowance.

Arguments Regarding Added Independent Claims 7 and 16

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application, independent claim 7 has been added herein to recite a combination of elements directed to a reduction gear for a walking assistance system, including *inter alia*

wherein the first planetary gear mechanism (P_1) is sandwiched between the first carrier (C_1) and the second carrier (C_2).

In addition, independent claim 16 has been added to recite a combination of elements directed to a reduction gear for a walking assistance system, including *inter alia*

wherein the input shaft (Si), the first planetary gear mechanism (P₁), the second planetary gear mechanism (P₂), and the motor are completely enclosed in a cylindrical casing.

By contrast, as can be seen in Park '347 FIG. 5, no disclosure is provided about the structural relationship between the first planetary gear mechanism 28, the first carrier 36, and the second carrier 38, as required by claim 1 of the present invention.

In addition, as can be seen in Park '347 FIG. 5, input shaft 26 is disposed outside of the transmission casing 42, and the configuration and shape of the transmission casing 42 is not disclosed.

At least for the reasons explained above, Applicants respectfully submit that the combination of elements as set forth in each of independent claims 7 and 16 is not disclosed or made obvious by the prior art of record, including Park '347.

Therefore, independent claims 7 and 16 are in condition for allowance.

Dependent Claims

The Examiner will note that dependent claims 8-15 and 17-21 have been added to set forth additional novel features of the invention.

All dependent claims are in condition for allowance due to their dependency from allowable independent claims, or due to the additional novel features set forth therein.

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Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 102(b)
are respectfully requested.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. It is believed that a full and complete response has been made to the outstanding Office Action, and that the present application is in condition for allowance.

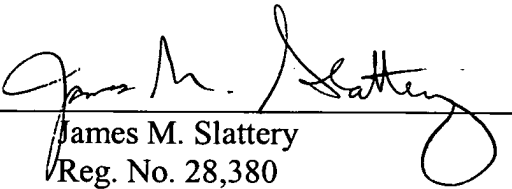
If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, he is invited to telephone Carl T. Thomsen, (Reg. No. 50,786) at (703) 208-4030(direct line).

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

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Attachments: Annotated portions of edited reference Park (U.S. 5,993,347)

5,993,347

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8. As a result, through the selective operation of the clutches 66, 68 and 70, one or two of the elements connected to the clutches are made to operate as input elements. 14

In addition, forming the brake assembly, the first brake 84 is interposed between the second ring gear 40 and the transmission housing 42, the second brake 86 is interposed between the first sun gear 34, the third brake 88 is interposed between the first planetary carrier 36, and the fourth brake 46 is interposed between the first ring gear 32 to allow the above elements to selectively operate as reaction elements, and the output gear 44 is disposed at an end portion of the second planetary carrier 38 to allow it to operate as an output element.

In the gear train of the third embodiment structured as above, the friction elements are operated, as shown in the operational chart of FIG. 6, to realize shifting. In the forward first speed, the first clutch 66 and the first brake 84 are controlled to be operated. 8

When this is done, the power of the input shaft 26 which rotates by the engine 2 makes the first sun gear 34 operate as an input element by the operation of the first clutch 66, and, at the same time, the second ring gear 40 to act as a reaction element by the operation of the first brake 84. Through the above operations, first speed shifting is realized, and through the second planetary carrier 38, output is realized. 8

If vehicle speed and throttle opening are increased in the above first speed state, the transmission control unit disengages the first clutch 66 and operates the second clutch 68. When this is done, an input element is changed to the first planetary carrier 36 according to the operation of the second clutch 68, and second speed shifting is realized. 10

If vehicle speed and throttle opening are increased in the above second speed state, the transmission control unit disengages the second clutch 68 and operates the third clutch 70. When this is done, an input element is changed to the first ring gear 32 according to the operation of the third clutch 70, and a third speed shifting is realized. 35

In the above third speed state, if vehicle speed and throttle opening are further increased, the transmission control unit disengages the first brake 84 and operates the first clutch 66. 8

When the above is done, reaction force is released in the third speed input state, and the first sun gear 34 operates as an input element, whereby second input is realized, and as there comes to be two input elements, fourth speed shifting is realized. 8

If vehicle speed and throttle opening are further increased in the above fourth speed state, the transmission control unit disengages the first clutch 66, operating in the fourth speed, and controls the second brake 86 to operate. 14

When the above is performed, input is realized through the first ring gear 32, and by the operation of the second brake 86, the first sun gear 34 operates as a reaction element to realize fifth speed shifting. 16

Also, in the above fifth speed, an overdrive state occurs wherein output speed is faster than input speed.

If vehicle speed and throttle opening are further increased in the above fifth speed state, the transmission control unit disengages the second brake 86, operating in the fifth speed, and controls the third brake 88 to operate. 16

When the above is performed, by the operation of the third brake 88 in the input state through the first ring gear 32, the first planetary carrier 36 operates as a reaction element thereby realizing sixth speed shifting. An overdrive state occurs in the above sixth speed as in the fifth speed. 65

Also, if the driver changes the selector lever to a reverse R range, the transmission control unit controls the first clutch 66 and the fourth brake 46 to operate.

When the above is performed, input is realized through the first sun gear 34 by the operation of the first clutch 66, and, at the same time, by the operation of the fourth brake 46, the first ring gear 32 operates as a reaction element to realize reverse shifting, and output is realized through the first planetary carrier 38.

Referring to FIG. 7, there is shown a schematic diagram of a gear train according to a fourth embodiment of the present invention. Clutches forming the clutch assembly are differently connected to brakes forming the brake assembly than in the third embodiment.

Namely, the first clutch 72 of the clutch assembly for transmitting the power of the engine 2 to the compound planetary gear set 6, is interposed between the input shaft 26 and the second ring gear 40, the second clutch 74 is interposed between the input shaft 26 and the second planetary carrier 38, and the third clutch 76 is interposed between the input shaft 26 and the first ring gear 32.

As a result, through the selective operation of the clutches 72, 74 and 76, one or two of the elements connected to the clutches are made to operate as input elements.

In addition, forming the brake assembly, the first brake 90 is interposed between the first sun gear 34 and the transmission housing 42, the second brake 92 is interposed between the second ring gear 40, the third brake 94 is interposed between the second planetary carrier 38, and the fourth brake 96 is interposed between the first ring gear 32 to allow the above elements to selectively operate as reaction elements, and the output gear 44 is disposed at an end portion of the first planetary carrier 36 to allow it to operate as an output element.

In the gear train of the fourth embodiment structured as in the above, the friction elements are operated, as shown in the operational chart of FIG. 9, to realize shifting. In the forward first speed, the first clutch 72 and the first brake 90 are controlled to be operated.

When this is done, the power of the input shaft 26 which rotates by the engine 2 makes the second ring gear 40 operate as an input element by the operation of the first clutch 72, and, at the same time, the first sun gear 34 to act as a reaction element by the operation of the first brake 90.

Through the above operations, first speed shifting is realized, and through the first planetary carrier 36, output is realized.

If vehicle speed and throttle opening are increased in the above first speed state, the transmission control unit disengages the first clutch 72 and operates the second clutch 74.

When this is done, an input element is changed to the second planetary carrier 38 according to the operation of the second clutch 74, and second speed shifting is realized.

If vehicle speed and throttle opening are increased in the above second speed state, the transmission control unit disengages the second clutch 74 and operates the third clutch 76.

When this is done, an input element is changed to the first ring gear 32 according to the operation of the third clutch 76, and third speed shifting is realized.

In the above third speed state, if vehicle speed and throttle opening are increased, the transmission control unit disengages the first brake 90 and operates the first clutch 72.

When the above is done, reaction force is released in the third speed input state, and the second ring gear 40 operates

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Nov. 30, 1999

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FIG. 6

Friction Element Range	8	10	12	14	16	18	46	Remark
R	○						○	
N								
D	1			○	↓			
	2	○		○				
	3		○	○				
	4	○	○	⊗	↓			
	5		○		○			
	6		○			○		